

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A device for detecting ~~faults due to permanent magnet degradation~~ demagnetization in a motor in a vehicle comprising:

a permanent magnet induced voltage monitor that measures a detected permanent magnet induced voltage of the motor at a predetermined speed, wherein the permanent magnet induced voltage monitor has

a sensor coil wrapped around a plurality of teeth in a plurality of slots of a stator of the motor adjacent to a rotor of the motor at an edge closest to a gap between the stator and the rotor of the motor, and wherein the sensor coil is not related to a plurality of windings of the motor, and

a voltmeter disposed in the vehicle coupled to the sensor coil of the motor, wherein the voltmeter periodically monitors of the state of magnetism of the permanent magnets in the motor during no load conditions to provide the detected permanent magnet induced voltage to a processor;

a predetermined irregularity in the motor that cooperates with the sensor coil to locate a position of each of a plurality of permanent magnets in the motor; and a processor that:

compares the detected permanent magnet induced voltage with a reference voltage that reflects a permanent magnet induced voltage of the motor with a fully magnetized permanent magnet at the predetermined speed; and

analyzes the detected permanent magnet induced voltage with reference to the reference voltage to determine whether a characteristic of the detected permanent magnet induced voltage indicates a ~~component~~ demagnetized permanent magnet of the motor ~~is faulty~~.

Claim 2 (cancelled).

Claim 3 (original): The device of claim 1 wherein the processor analyzes the detected permanent magnet induced voltage with reference to a point of synchronization that relates to a position of a permanent magnet in the motor.

Claim 4 (currently amended): The device of claim 3 wherein the point of synchronization is caused by a the predetermined irregularity in the motor.

Claim 5 (original): The device of claim 4 wherein the predetermined irregularity is formed in one of a rotor and a permanent magnet.

Claim 6 (original): The device of claim 3 wherein the point of synchronization is caused by a predetermined change in one of motor reluctance and magnetic strength.

Claim 7 (currently amended): A method for identifying a component that is ~~faulty and~~ causing permanent magnet ~~degradation~~ demagnetization in a motor of a vehicle, the method comprising the steps of:

providing a sensor coil wrapped around a plurality of teeth in a plurality of slots of a stator of the motor adjacent to a rotor of the motor at an edge closest to a gap

between the stator and the rotor of the motor, wherein the sensor coil is not related to a plurality of windings of the motor;

using the sensor coil to sense permanent magnet induced voltage in the motor;

providing a voltmeter disposed in the vehicle coupled to the sensor coil of the motor;

using the voltmeter to periodically monitor the state of magnetism sensed by the sensor coil of each of the plurality of permanent magnets in the motor during no load conditions;

providing a predetermined irregularity in the motor that cooperates with the sensor coil to locate a position of each of a plurality of permanent magnets in the motor;

detecting a first signal from the voltmeter that is a function of permanent magnetization of a plurality of permanent magnets in the motor;

comparing the first signal with a reference signal that represents a function of permanent magnetization of the plurality of magnets in the motor, wherein the reference signal reflects a level of magnetization that is expected where the plurality of permanent magnets in the motor are fully magnetized; and

analyzing a difference between the first signal and the reference signal to determine a ~~faulty component~~ demagnetized permanent magnet selected from the plurality of permanent magnets that is likely causing the difference.

Claim 8 (currently amended): The method of claim 7 further comprising the step of:

setting a diagnostic code indicating the ~~faulty component~~ demagnetized permanent magnet selected from the plurality of permanent magnets.

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Claim 9. (original): The method of claim 7 wherein the first signal is a permanent magnet induced voltage and the reference signal is a permanent magnet induced voltage.

Claim 10. (original): The method of claim 7 wherein the first signal includes a point of synchronization and the reference signal includes a point of synchronization.

Claim 11. (currently amended): The method of claim 10 wherein the point of synchronization of the first signal is determined by a the predetermined irregularity in the motor.

Claim 12 (original): The method of claim 11 wherein the predetermined irregularity causes a change in one of motor reluctance and magnetic strength.

Claim 13 (currently amended): The method of claim 9 wherein the first signal is detected by inducing a voltage in a the sensor coil adjacent a stator of the motor.

Claim 14 (currently amended): A device for identifying a ~~component~~ permanent magnet that is ~~faulty and causing permanent magnet degradation~~ demagnetized in a motor of vehicle, the device comprising:

a sensor coil wrapped around a plurality of teeth in a plurality of slots of a stator of the motor adjacent to a rotor of the motor at an edge closest to a gap between the stator and the rotor of the motor that operates to sense permanent magnet induced voltage in the motor, and wherein the sensor coil is not related to a plurality of windings of the motor;

a voltmeter disposed in the vehicle coupled to the sensor coil of the motor, wherein the voltmeter periodically monitors of the state of magnetism of the permanent magnets in the motor during no load conditions to provide the detected permanent magnet induced voltage to a processor;

a predetermined irregularity in the motor that cooperates with both the sensor coil and the processor to locate a position of each of the plurality of permanent magnets in the motor; and

a processor that:

receives a first signal that is a function of permanent magnetization of a plurality of permanent magnets in the motor;

compares the first signal with a reference signal that represents a function of permanent magnetization of the plurality of magnets in the motor, wherein the reference signal reflects a level of magnetization that is expected where the plurality of permanent magnets in the motor are fully magnetized;

analyzes a difference between the first signal and the reference signal to determine a ~~faulty component~~ demagnetized permanent magnet selected from the plurality of permanent magnets in the motor that is likely causing the difference.

Claim 15 (currently amended): The device of claim 14 further comprising the processor setting a diagnostic code indicating the ~~faulty component~~ demagnetized permanent magnet.

Claim 16 (original): The device of claim 14 wherein the first signal is a permanent magnet induced voltage and the reference signal is a permanent magnet induced voltage.

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Claim 17 (original): The device of claim 14 wherein the first signal includes a point of synchronization and the reference signal includes a point of synchronization.

Claim 18 (currently amended): The device of claim 17 wherein the point of synchronization of the first signal is determined by a the predetermined irregularity in the motor.

Claim 19 (original): The device of claim 18 wherein the predetermined irregularity is formed in one of a rotor and a permanent magnet of the plurality of permanent magnets.

Claim 20 (currently amended): The device of claim 16 wherein the first signal is detected by inducing a voltage in a the sensor coil ~~adjacent a stator of the motor~~.

Claim 21 (newly added): The device of claim 1 wherein current to the motor is limited to an amount that prevents damage to components of the vehicle when the magnetic strength of the motor is below a predetermined first threshold.

Claim 22 (newly added): The device of claim 21 wherein the processor is calibrated to force the motor to provide the torque required when the current to the motor is limited.

Claim 23 (newly added): The device of claim 22 wherein operation of the motor is suspended and the motive power within the vehicle is switched to an available second motor providing an alternative motive source when a second threshold of magnetization is met.